Claims

1. A poultry feed diet composition for raising poultry within confined spaces such as poultry pens, the poultry feed diet composition comprising a balanced feed composition plus a citrus feed supplement, said feed supplement being a citrus byproduct generated by citrus juice expressing from citrus fruit, said citrus feed supplement including citrus byproduct particles, and said citrus feed supplement being at a concentration of not more than about 2 weight percent, based on the total weight of the poultry feed diet composition.

2. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of not greater than about 1.5 weight percent, based on the total weight of the poultry feed diet composition.

3. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of at least about 0.2 weight percent and up to about 1 weight percent, based upon the total weight of the poultry feed diet composition.

4. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of not greater than about 32 pounds per ton of feed diet composition.

5. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of not greater than about 24 pounds per ton of feed diet composition.

6. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of at least about 4 pounds and up to about 16 pounds per ton of feed diet composition.

7. The poultry feed diet composition in accordance with claim 1, wherein said citrus byproduct has a moisture content of between about 5 and about 12 percent by weight, based upon the total weight of the citrus byproduct.

8. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement citrus particles comprise dried citrus byproduct flake.

9. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement citrus particles comprise pelletized dried citrus byproduct.

10. The poultry feed diet composition in accordance with claim 1, wherein said citrus particles are selected from the group consisting of a citrus peel, citrus pulp, citrus flavedo, citrus albedo, citrus rag, and combinations thereof.

11. The poultry feed diet composition in accordance with claim 1, wherein said citrus byproduct of the citrus feed supplement is a dried and limed byproduct which had been ground to a particle size of about 2mm or less to provide said citrus particles.

12. The poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement includes a combination of by product components, each in its native

state as present in dried citrus byproduct from juice extraction equipment.

13. The poultry feed diet composition in accordance with claim 12, wherein said byproduct components include: (a) pectin, demethylated pectin, and combinations thereof; (b) a food grade citrus-originating acid; (c) hesperidin, other flavonoids, and combinations thereof; (d) one or more limonin glucosides, other bioflavonoids, and combinations thereof; and (e) sinensetin, tangeretin, nobiletin, other polymethoxylated flavones, and combinations thereof.

14. The poultry feed diet composition in accordance with claim 13, wherein said citrus byproduct (c) component is a flavonoid selected from the group consisting of naringin, naringenin, narirutin, hesperidin, hesperetin and combinations thereof.

15. The poultry diet feed composition in accordance with claim 13, wherein said citrus byproduct (d) component is a bioflavonoid selected from the group consisting of limonin, nomolin, a limonin glucoside, d-limonene, and combinations thereof.

16. The poultry feed diet composition in accordance with claim 13, wherein said citrus byproduct components further include a material selected from the group consisting of ascorbic acid, a carotenoid, beta-carotene, beta-cryptoxanthin, lycopene, xanthophyll, and combinations thereof.

17. The poultry diet feed composition in accordance with claim 13, wherein said citrus byproduct components further include tocopherol.

18. The poultry diet feed composition in accordance with claim 12, wherein said citrus byproduct components include pectin, demethylated pectin, citric acid, folic acid, ascorbic acid, a carotenoid, beta-carotene, beta-cryptoxanthin, lycopene, xanthophyll, naringin, naringenin, narirutin, hesperidin, hesperetin, sinensetin, tangeretin, nobiletin, alpha-tocopherol, limonin, nomolin, a limonin glucoside, and d-limonene.

19. The poultry diet feed composition in accordance with claim 12, wherein said citrus byproduct components include a pectin, a food grade acid, ascorbic acid, a carotenoid, a citrus originating flavonoid, a citrus originating polymethoxylated flavone, and a tocopherol.

20. A process for enhancing commercial poultry raising operations, comprising:

supplying a confined space within which poultry chicks are raised, the combined space having a poultry feeding area;

providing a poultry feed diet composition which comprises a balanced feed composition and a citrus feed supplement, said citrus feed supplement being a citrus byproduct generated by expressing citrus juice from citrus fruit, the citrus byproduct containing citrus peel and pulp, said citrus feed supplement being at a concentration of not more than about 2 weight percent, based on the total weight of the poultry feed diet composition; and

placing said poultry feed diet composition within the poultry feeding area and confining poultry chicks in the confined space, thereby having the poultry feed on the poultry feed diet.

21. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of not greater than about 1.5 weight percent, based on the total weight of the poultry feed diet composition.

22. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of at least about 0.2 weight percent and up to about 1 weight percent, based upon the total weight of the poultry feed diet composition.

23. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of at least about 4 pounds and up to about 16 pounds per ton of feed diet composition.

24. The process in accordance with claim 20, wherein said citrus byproduct has a moisture content of between about 5 and about 12 percent by weight, based upon the total weight of the citrus byproduct.

25. The process in accordance with claim 20, wherein said citrus feed supplement comprises particles of dried citrus byproduct flake.

26. The process in accordance with claim 20, wherein said citrus feed supplement comprises particles of pelletized dried citrus byproduct.

27. The process in accordance with claim 20, wherein said citrus byproduct contains citrus waste selected from the group consisting of citrus peel, citrus pulp, citrus flavedo, citrus albedo, citrus rag, and combinations thereof.

28. The process in accordance with claim 20, wherein said citrus byproduct of the citrus feed supplement is a dried and limed byproduct which had been ground to a particle size of about 2mm or less to provide said citrus particles.

29. The process in accordance with claim 20, wherein said citrus feed supplement includes a combination of byproduct components, each in its native state as present in dried citrus byproduct from juice extraction equipment.

30. The process in accordance with claim 29, wherein said byproduct components include: (a) pectin, demethylated pectin, and combinations thereof; (b) a food grade citrus-originating acid; (c) hesperidin, other flavonoids, and combinations thereof; (d) one or more limonin glucosides other bioflavonoids and combinations thereof; and (e) sinensetin, tangeretin, nobiletin, other polymethoxylated flavones, and combinations thereof.

31. The process in accordance with claim 20, further including:

continuing said confining and having the poultry fed for a length of time adequate for the poultry to grow to poultry of a size suitable for commercial meat supply use; and

providing through said process a quality characteristic of the poultry which is improved when compared with the same characteristic of poultry chicks raised in the same manner on said balanced feed composition in the absence of said citrus feed supplement.

32. The process in accordance with claim 31, further including calculating an adjusted feed conversion value for the poultry raised according to the process, said adjusted feed conversion value being less than that of poultry raised on a feed comprising said balanced feed composition and a feed supplement comprised of hesperidin, limonin glucoside and citrus pectin which are not in a native state as present in dried citrus byproduct from citrus juice extraction equipment.

33. The process in accordance with claim 20, further including calculating a feed conversion value for the poultry feed diet expended in the poultry raising operation, said feed conversion value being less than that for raising poultry with a feed comprising said balanced feed composition and a feed supplement comprised of hesperidin, limonin glucoside and citrus pectin which are not in a native state as present in dried citrus byproduct from citrus juice extraction equipment.

34. The process in accordance with claim 20, further including calculating a feed conversion value for the poultry feed diet expended in the poultry raising operation, said feed conversion value being less than that for raising poultry with a feed comprising said balanced feed composition in the absence of the said citrus feed supplement.

35. The process according to claim 31, further including detecting average ammonia levels in the confined space at the completion of said continuing procedure, said average ammonia level being less than that of the same process which omits use of the citrus feed supplement.

36. The process according to claim 31, further including determining an HDL level of said poultry after said continuing procedure, said HDL level being greater than that of the same process which omits use of the citrus feed supplement.

37. The process according to claim 20, further including providing the citrus feed supplement into the poultry feeding area in the absence of an extraction being practiced upon the citrus byproduct peel and pulp component.

38. The process according to claim 20, wherein the providing of said citrus feed supplement places citrus byproduct into the poultry feed diet without purifying the citrus byproduct present in the citrus feed supplement.

39. The process according to claim 20 wherein the providing of said citrus feed supplement places citrus byproduct into the poultry feed diet without extracting the citrus byproduct present in the citrus feed supplement.